Patent claims

1. A method for detecting the beginning of combustion in an internal combustion engine (1) comprising several cylinders (2, 3, 4, 5) by means of a rotation speed signal determined for a shaft (6) of the internal combustion engine (1), in which
   - at least one segment signal (SS), whose signal length corresponds to an integral full rotation of the shaft (6), is extracted from the rotation speed signal, so that in the rotation angle range represented by the signal length each cylinder (2, 3, 4, 5) ignites one time,
   - a cylinder signal (ZS1, ZS2, ZS3, ZS4), which substantially reproduces the operational state in one of the cylinders (2, 3, 4, 5), is generated from the segment signal (SS),
   - the cylinder signal (ZS1, ZS2, ZS3, ZS4) is transformed into a cylinder frequency signal (FS 1, FS2, FS3, FS4) in an angle frequency range and
   - a signal information indicating the beginning of combustion in the associated cylinder (2, 3, 4, 5) is extracted from the cylinder frequency signal (FS 1, FS2, FS3, FS4) at at least one predefined angle frequency.

2. A method according to claim 1, **characterized in that** the cylinder signal (ZS1, ZS2, ZS3, ZS4) is generated by means of extraction of a partial signal from the segment signal (SS), the partial signal detecting the rotation angle range, within which the concerned cylinder (2, 3, 4, 5) ignites.

3. A method according to claim 1, **characterized in that** the operational state in the cylinder (2), for which the beginning of combustion is to be detected, is

the beginning of combustion is to be detected, is adjusted and in that the segment signal (SS) resulting from adjustment is used as a whole as the cylinder signal (ZS1) which is significant for this cylinder (2).

4. A method according to one of the claims 1 to 3, **characterized in that** the cylinder frequency signal (FS1, FS2, FS3, FS4) is generated by means of a discrete Hartley-Transformation (DHT) or a discrete Fourier-Transformation (DFT) or by means of digital filtering.

5. A method according to one of the preceding claims, **characterized in that** at least two successive segment signals (SS) are determined arithmetically.

6. A method according to one of the preceding claims, **characterized in that** for generating the rotation speed signal a transmitter wheel (7) is used and that the inaccuracies in the segment signal (SS) resulting from transmitter wheel errors are at least largely eliminated.

7. A method according to one of the preceding claims, **characterized in that** by means of a digital signal processing an improved segment signal (SS*), in particular with a higher scanning rate, is generated.

8. A method according to claim 7, **characterized in that** the segment signal (SS) is subject to an interpolation method, in particular to a Lagrange- or a sinc-interpolation.

9. A method according to claim 7, **characterized in that** the segment signal (SS) is subject to a frequency

transformation, in particular to a discrete Hartley-Transformation or a discrete Fourier-Transformation.

10. A method according to one of the preceding claims, **characterized in that** the signal information including the beginning of combustion is used for regulating the beginning of combustion.